CHAPTER 2. STUDY AREA OVERVIEW

This chapter presents a descriptive overview of the study area in both a watershed and local context. In recent years, federal agencies have adopted watershed-based approaches for evaluating water- and land-resource management decisions, with the watershed being the fundamental management unit. We therefore provide a brief overview of the character and resources of the watershed of the La Plata River. The second section of this chapter identifies and describes those lands within the study area. Specifically, we discuss the location, land ownership, physical character, and existing and historical land uses of the La Plata River corridor. Additionally, we explain how we have subdivided the study area by geomorphic segments and river reaches for analysis and discussion of the existing environment (Chapter 3), and by land owner for discussion of mitigation opportunities and potential (Chapter 4).

2.1 LA PLATA RIVER WATERSHED

2.1.1 Watershed Description

The study area is located in the eastern Colorado Plateau semidesert province. The La Plata River is a tributary of the San Juan River, which in turn is a tributary of the Colorado River. The La Plata River originates in the La Plata Mountains about 25 miles northwest of Durango, Colorado and generally flows southward to its confluence with the San Juan River near Farmington, New Mexico (Figure 1-1). In its headwaters, the watershed consists of relatively erosion-resistant, igneous rock formations that have been uplifted to form a forested mountain chain that rises to more than 13,000 feet. Near the town of Hesperus, Colorado, the mountains merge toward the south into an area of mesas, plateaus, and shallow canyons carved into more easily eroded, sedimentary rocks.

The La Plata Mountains are mesic and receive more than 30 inches of precipitation per year—much of which accumulates as winter snowpack that provides the following year's water supply. The lowlands to the south of the mountains are semiarid to arid. Average annual precipitation is only about 8 inches a year near Farmington. There is dryland farming on the tablelands rising above the La Plata River, and irrigated farming is undertaken where water can be diverted from the La Plata River or one of its major tributary streams.

2.1.2 Hydrology

The hydrologic characteristics of the La Plata River have a profound influence on the riparian-wetland, fishery, and wildlife resources of the watershed. Flow in the La Plata River is characteristic of many western rivers that have watersheds containing both a semiarid plains or plateau region and a higher mountainous area. The flow hydrograph typically crests during from midsummer until the following year's spring runoff event. However, rainfall-induced floods

springtime melting of the mountain area snowpack (Figure 2-1). Streamflow is generally low that originate as overland runoff in the watershed's lowlands may occur from July through October. These flood events have high peak-discharge flows but are short-lived, with the entire flood event usually lasting less than one or two days, and sometimes just a few hours. Late-summer floods typically have higher instantaneous peak flows compared to spring snowmelt floods, with this trend becoming more apparent downstream from Hesperus. La Plata River high flow conditions produce large suspended sediment loads and turbid water, a condition that increases downstream due to an increasing number of arroyo tributaries. Average annual streamflow of the La Plata River in the study area is about 26,000 acre-feet. Mean annual discharge is about 36 cfs.

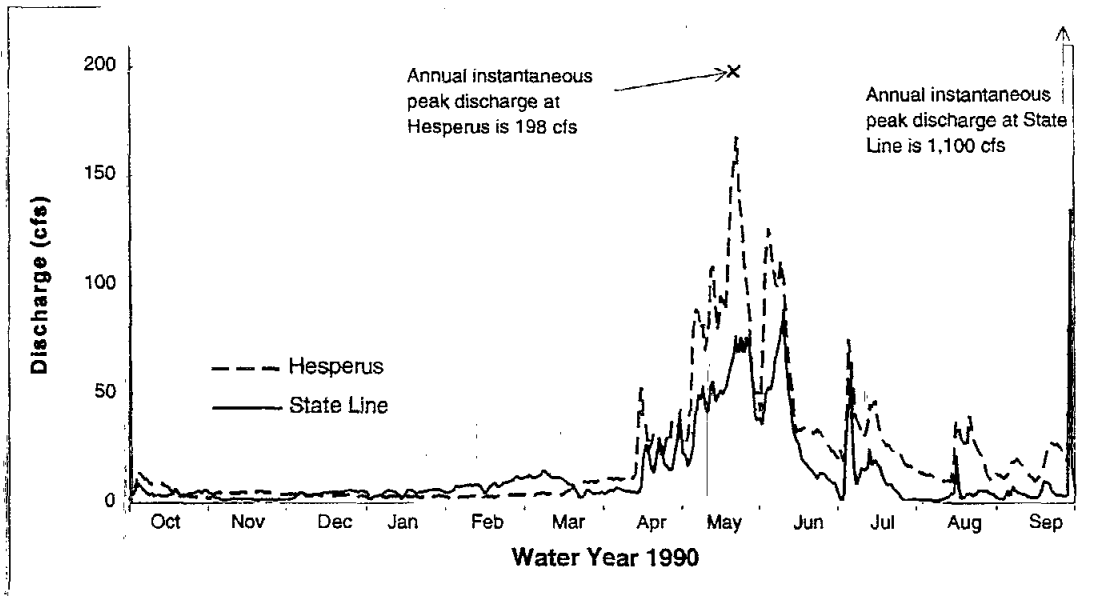

Figure 2-1. —La Plata River hydrographs as recorded at the Hesperus, Colorado, and Colorado-New Mexico State line gages for water year 1990, a fairly typical year. Also shown are the annual instantaneous peak discharges that occurred at these locations.

In addition to seasonal variations in annual streamflow, streamflow also varies along the length of the La Plata River. In general, flows tend to decrease downstream from Hesperus mostly due to irrigation diversions. Based upon data from three gaging stations on the La Plata River, mean annual streamflow decreases from 45 cfs at Hesperus, to 36 cfs at the Colorado-New Mexico state line, to 29 cfs at Farmington. However, flow along the river's course is much more variable than is indicated by mean flow at the three gages.

Above Hesperus, the river usually flows year-round. Flows between Hesperus and the Cherry Creek confluence are substantially reduced by irrigation diversions having water rights to divert about 270 cfs. Occasionally, these diversions may dewater certain reaches between Hesperus and the Cherry Creek confluence. From about the Cherry Creek confluence to the southern limits of the study area, the river becomes perennial due to the combined inflow from the La Plata River,

Cherry Creek, Long Hollow, ground-water recharge, and several tributary streams draining irrigated lands east of the river. However, summer base flows within the study area are very low and range from about 2 cfs between Cherry Creek and Long Hollow, and about 8 cfs below Long Hollow. Downstream of the study area, several diversions with combined water rights of about 22 cfs may completely dewater the river during the summer months, leaving little to no flow at the Colorado-New Mexico state line. About two miles farther downstream in New Mexico, any flow remaining in the river is generally depleted during the irrigation season by a relatively large irrigation diversion. Downstream to Farmington there are several additional water rights for diversions, but the river is frequently dry during the irrigation season.

Ground water occurs throughout the watershed in sandstone and shale bedrock aquifers, in alluvial aquifers associated with the La Plata River and its tributaries, and in terrace aquifers covering tableland areas. Ground water is not a significant resource in the southern lowlands of the watershed, but the alluvial aquifer along the La Plata River maintains a substantial amount of riparian-wetland vegetation in an otherwise semi-arid environment.

2.1.3 Vegetation

Vegetation communities within the mountainous portions of the watershed are dominated by aspen and spruce-fir forests. Vegetation communities in the watershed's lowlands are typical of those found on the semi-arid Colorado Plateau. Between 8,000 and 6,000 feet in elevation, the landscape is dominated by dry uplands consisting of pinyon pine and juniper woodlands and sagebrush scrubland. As elevation continues to decrease to the south, sagebrush scrubland and desert grassland are the dominant plant communities. Conversion of lowland vegetation communities to industrial, commercial, residential, and agricultural land uses has been common and is ongoing.

Within the mesic mountainous portions of the watershed, riparian and wetland plant communities are both diverse and abundant. However, within the lowlands of the watershed, naturally occurring riparian-wetland communities are very limited in their extent. They occur almost exclusively along the valley bottom of the La Plata River corridor and its major tributaries. These communities have been significantly altered by the diversion of streamflows from the La Plata River and the management of valley bottom lands for agricultural land uses.

Riparian-wetland vegetation also occurs along irrigation ditches and natural drainages receiving ample amounts of irrigation return flows. These artificially created riparian-wetlands would either not exist or be greatly reduced in size if irrigation practices were removed or their efficiency significantly improved.

2.1.4 Fisheries

The fishes of the La Plata River reflect a low-diversity assemblage typical of most mid- to high-elevation tributaries of the Colorado River Basin and the San Juan River Subbasin. Historically, the native ichthyofauna consisted of five confirmed species (Sublette et al. 1990), including roundtail chub (*Gila robusta*), speckled dace (*Rhinichthys osculus*), flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*C. discobolus*), and mottled sculpin (*Cottus bairdi*). These species persist in the La Plata River in reduced distribution and abundance along with low numbers of six non-native species: fathead minnow (*Pimephales promelas*), red shiner (*Cyprinella lutrensis*), rainbow trout (*Onchorynchus mykiss*), brown trout (*Salmo trutra*), brook trout (*Salvelinus fontinalis*), and black bullhead (*Ameiurus melas*).

The Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*), as well as the endangered Colorado squawfish (*Ptychocheilus lucius*) and razorback sucker (*Xyrauchen texanus*), are also native to the San Juan River Subbasin but were never reported from the La Plata River (Sublette et al. 1990). Because irrigation diversions create barriers and dewater sections of the lower La Plata River, there is little exchange of fishes with the main San Juan River. These barriers effectively prevent the movement of non-native fish present in the San Juan River into the upper La Plata River north of the Colorado-New Mexico state line. Hence, the upper La Plata River is an important enclave for native fish populations of this subbasin.

2.1.5 Wildlife

The variety of wildlife habitats encountered in the La Plata River watershed reflects the diverse topography that occurs in a relatively short distance. The La Plata mountains peak at more than 13,000 feet. From its headwaters, the river drops rapidly into an area of plateaus and mesas. In the vicinity of the study area, elevations are around 6,000 feet. Major wildlife habitats of the watershed range from alpine tundra, aspen and spruce-fir forests in the mountains to semidesert woodland, shrubland, and grassland in the lowlands. A diversity of riparian-wetland habitats occurs along the river and most of its tributaries.

For many wildlife species, a large range of habitats is important in their life cycle. Lower elevation areas, such as those within the study area, can serve as important migration corridors or wintering areas for wildlife that breed at upper elevations. Higher elevation habitats have some measure of long-term protection because they are located within the San Juan National Forest. However, lower elevation areas, in particular the transition area between National Forest lands to the north and study area lands to the south, appear much more susceptible to losses in the future through human development.

2.1.6 Threatened and Endangered Species

Endangered species most likely to utilize riparian-wetland habitats along the La Plata River are the bald eagle (*Haliaeetus leucocephalus*) and the southwestern willow flycatcher (*Empidonax trailii extimus*). Reclamation has conducted surveys for bald eagle and southwestern willow flycatcher over the past few years. Use of communal roosts along the La Plata River corridor by wintering bald eagles has been consistently documented, and it is suspected that they may have attempted nesting within the vicinity of the study area.

Willow flycatchers have been observed along the river corridor. Five willow flycatchers (*Empidonax trailii* ssp.) were confirmed within the study area in May 1997; however, no willow flycatchers were confirmed during subsequent surveys when nesting activities would have taken place (Rhea 1997). It appears that the observed willow flycatchers were using the river valley as a migratory corridor. Use of the river valley by breeding pairs is unknown at this time. Therefore, it is not known whether the observed willow flycatchers were the endangered southwestern willow flycatcher or an unprotected *Empidonax traillii* subspecies. These results are consistent with a survey conducted along the La Plata River by the National Biological Survey in 1994 (Sedgwick 1994), in that migratory willow flycatchers were observed but no breeding pairs were documented. It is believed, however, that suitable habitat exists for this subspecies within portions of the study area and it is possible that this species could utilize riparian-wetland habitats along La Plata River.

It is possible that the endangered peregrine falcon (*Falco peregrinus*) could use the study area for hunting. Loggerhead shrike (*Lanius ludovicianus*), a candidate species, may also utilize riparian-wetland habitats along the river corridor. The status of the loggerhead shrike along the La Plata River corridor has been less documented.

2.2 STUDY AREA DESCRIPTION

There were two main criteria that Reclamation used in selecting a section of the river corridor for evaluating mitigation opportunities and potential. First, and most important, the selected section had to maintain perennial flows; otherwise, mitigation values for native fish and certain wildlife would be very low or nonexistent and the potential for riparian-wetland mitigation would be greatly diminished. Second, because the majority of the land along the river corridor in the lower watershed is in neither federal nor state ownership, the selected section had to include lands whose owner(s) would be willing to sell land titles or easement rights or otherwise participate.

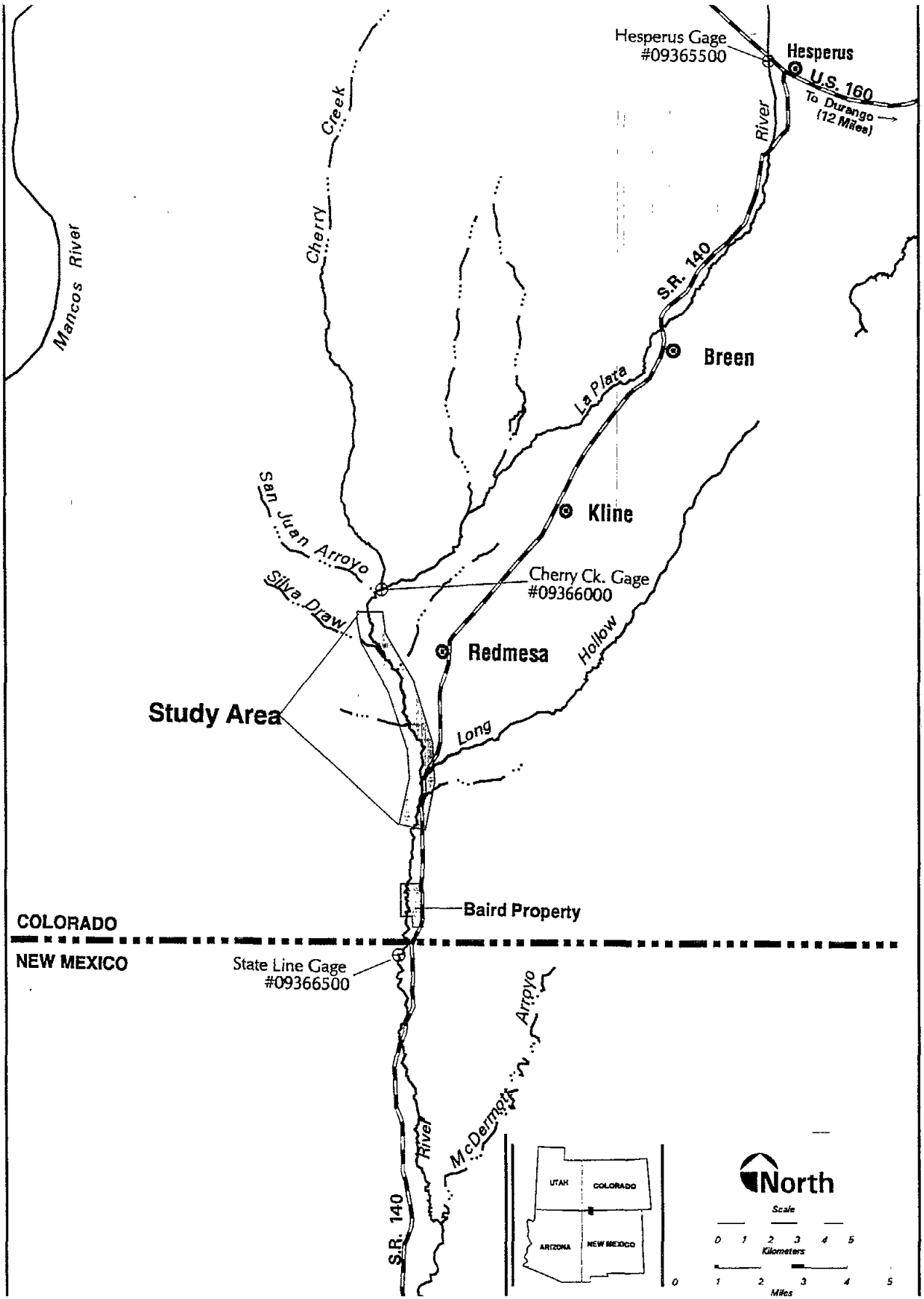

Figure 2-2. —Study area location map.

2.2.1 Location and Land Ownership

The selected study area has perennial river flows and contains about 5 miles of the La Plata River corridor between the confluence with Cherry Creek to the north, and a point approximately 1 mile downstream of the confluence with Long Hollow to the south (Figure 2-2). The eastern and western limits of the study area are defined as the walls of the La Plata River valley. The study area encompasses a total of approximately 462 acres of river corridor and includes land owned by five separate entities. Approximately 9 acres of highway right-of-ways located in the southern portion of the study area are not included in this acreage.

Within the study area, the majority of the land along the river corridor (approximately 68 percent) is currently owned by C. W. Huntington. Mr. Huntington is seeking to sell his property. Reclamation has acquired the first option to purchase Mr. Huntington's property, which includes approximately 309 acres of the La Plata River corridor and 5,680 acres of lands outside of the river corridor. The Huntington property encompasses the river corridor within three separate parcels. The upstream and downstream limits of the study area are defined by the northern and southern property boundaries of the northernmost and southernmost parcels, respectively, of the Huntington property (Figure 2-3) (Table 2-1).

Table 2-1. —Land ownership within the La Plata River corridor study area.

Landowner	Acres of River Corridor within Study Area	Percent Total
C. W. Huntington	309	67%
North Parcel	163	35%
Central Parcel	50	11%
South Parcel	96	21%
Southern Ute Indian Tribe	109	23.5%
North Parcel	87	19%
South Parcel	22	4.5%
Myron and Bob Taylor	30.5	6.5%
Bob and Anna Taylor	2.5	0.5%
Don Boyle	11	2.5%
Total	462	100%

In addition to the Huntington property, the study area includes two parcels of SUIT land that encompass a total of approximately 109 acres (or about 23.5 percent) of the river corridor (Figure 2-3). The SUIT are major stakeholders in the ALP Project and have expressed an interest in evaluating mitigation opportunities on Tribal lands. Near the Long Hollow confluence, approximately 30.5 acres (or about 6.5 percent) of the river corridor are owned by Myron and

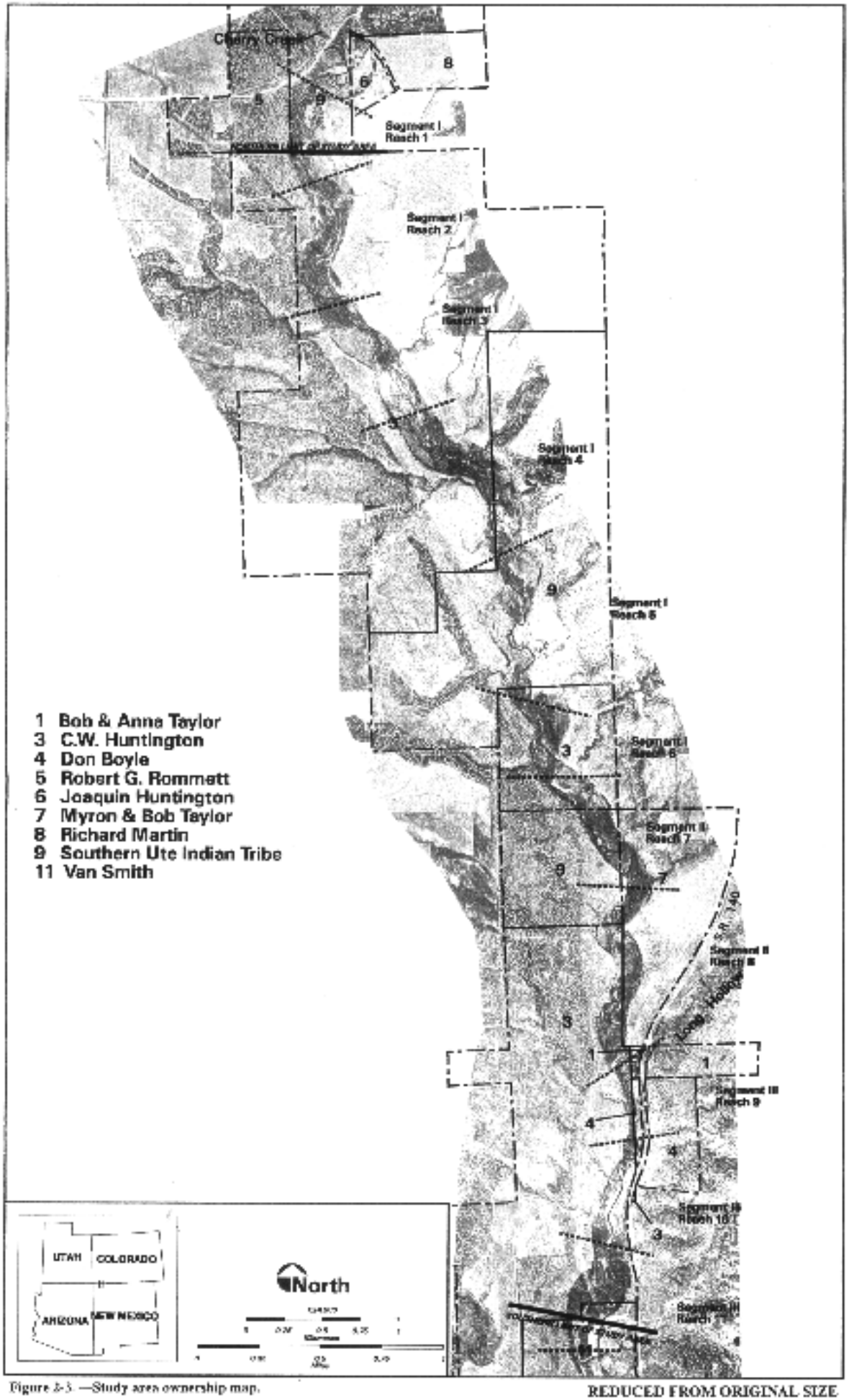

Figure 3-3.—Study area ownership map.

REDUCED FROM ORIGINAL SIZE

Bob Taylor, 11 acres (or about 2.5 percent) are owned by Don Boyle, and 2.5 acres (or about 0.5 percent) are owned by Bob and Anna Taylor (Figure 2-3). Reclamation may consider approaching these private landowners regarding their interest to participate with mitigation for the ALP Project.

Resource characteristics of all properties within the study area were equally assessed.

2.2.2 Physical Description

The La Plata valley is a major landform that has been carved into the landscape by the La Plata River during recent geologic time. The valley, which ranges from about 500 to 1,000 feet across, generally has a north-south bearing although it does display a slightly sinuous pattern. The channel averages about 30-feet wide, but varies dramatically in character from a meandering single-thread channel to a braided channel. The floor of the valley is inset into the surrounding tablelands about 60- to 120-feet vertically (Figure 2-4), and is greatly influenced by the hydrology and fluvial processes of the river. The valley floor has a moist environment capable of supporting riparian-wetland vegetation, whereas the adjacent tablelands, in the absence of irrigation water, can only support semi-arid plant communities.

Figure 2-4. —Typical setting of the La Plata River valley within the study area.

Because the valley has been downcut into a moderately resistant sandstone formation (the Cliff House Sandstone), the valley walls are generally steep and contain rock ledges. Subsequently, there is a sharp transition between the riparian-wetland vegetation on the valley floor and the semi-arid vegetation on the flanking tablelands to the east and west. Between its walls, the valley floor consists of several, relatively flat surfaces of alluvial sedimentary units that have been deposited by the La Plata River. These sedimentary deposits and their associated geomorphic surfaces provide the physical template for the riparian-wetland plant communities of the valley floor. More detailed descriptions of the La Plata River and its valley are provided in Chapter 3.

2.2.3 Land Use

Although prehistoric farming was likely being practiced in the valley by the Anasazi more than 1,000 years ago, modern irrigated farming has been undertaken in the La Plata River valley only since the late 1800s. Within the study area, one irrigation canal diverts water from the La Plata River for irrigation of lands downstream. A couple of very small parcels on the valley floor in the study area were likely farmed during the early 1900s. However, the primary use of study area lands has been and continues to be livestock grazing. More recently, private landowners have been taking advantage of big game use of the river corridor by selling trespass permits for elk and deer hunting.

2.2.4 Study Area Segmentation

The study area was subdivided into three segments (Segments I, II, and III) for geomorphic analyses. These segments (Figure 2-3) divide the study area at locations where there are changes in hydrologic and/or geomorphic conditions of the river and its valley. These changes affect the river channel and its floodprone areas, which in turn affect riparian-wetlands and fish and wildlife habitats. At the Segment I-Segment II division there are several subtle changes in valley and river geomorphology, including changes in valley width, valley slope, character of the stream channel, and texture of valley floor sediments. The division between Segments II and III is located at the confluence with Long Hollow and is based upon that tributary's effect on the hydrology and sedimentology of the La Plata River downstream.

Eleven river reaches were delineated within the study area, primarily to facilitate analyses for native fish habitat (Figure 2-3). Reaches were delineated based on channel features consistent with Rosgen's (1996) Level I geomorphic characterization. Although these divisions of the corridor provide internally consistent segments and reaches for discussing most resources, they are neither absolute nor perfect delineations for all resources discussed herein.